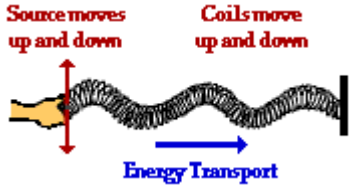
Activity #1



Title: An Investigation into Transverse Waves –Student's Copy

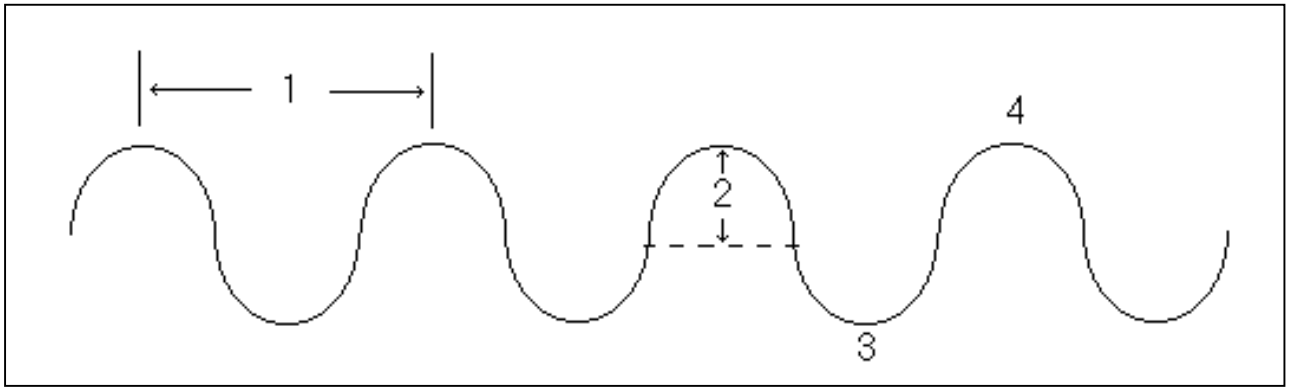
Note to students: All answers and diagrams are to be made on a separate answer sheet. Make no marks on this paper.

Purpose:

- To become familiar with the nomenclature associated with transverse waves
- To visualize the processes by which waves carry energy from one point to another

Materials: long (small diameter) spring, meter stick, string (5 cm)

Procedure: 1-4. Reproduce the diagram below on your answer sheet. Use your textbook or perform an Internet search (http://www.glenbrook.k12.il.us/gbssci/phys/Class/waves/u10l2a.html) to label the various components of the transverse wave.



5. To determine if you understand the concept, draw a wave that has TWICE the wavelength of the one you diagrammed in #1-4 above.
6. Draw a wave that has one half the amplitude of your first wave.
7. Now you are going to create a wave like the ones diagrammed above. Place the long, small diameter spring on the floor. Have one of your partners hold one end while you snap the opposite end of the spring away from you about 20 cm and then back again to the starting position. Do this about twice every second continuously. You are producing a **transverse wave** much like the one diagramed above. Using a meter stick, have the third member of your group measure and record the wavelength in centimeters.
8. Now snap the spring about four times each second continuously. Measure and record the new wavelength.
9. The *frequency* of a wave is the number of waves that are produced in one second. From your observations in # 7 & 8 above, complete the following sentence: As the frequency of a wave increases, its wavelength _____. (increases, decreases, remains about the same size)

10. Tie a small, white string to one coil near the center of your spring. Create a wave that travels down the spring as in #8 above. Describe the motion of the string as the energy of the wave passes down the spring. (i.e., The string does not move at all. The string moves in the same direction (parallel to) as the wave. The string movement is perpendicular (90^{o}) to the direction of the wave.)
11. As the wave travels from one end of the spring to the other, do the actual coils of the spring move from one end to the other?
12. Describe what you have to do to create a wave that travels down the spring with twice the AMPLITUDE of the first.